

EXHIBIT K

NOT FOR CITATION
IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

DOLBY LABORATORIES, INC. and DOLBY
LABORATORIES LICENSING CORPORATION,

Plaintiffs,

v.

LUCENT TECHNOLOGIES INC. and LUCENT
TECHNOLOGIES GUARDIAN I LLC,

Defendants.

Case Number C-01-20709 JF (RS)

ORDER CONSTRUING CLAIMS
OF UNITED STATES PATENTS
NO. 5,341,457 AND NO. 5,627,938

[Docket No. 261]

AND RELATED COUNTERCLAIMS

On October 15, 2003, the Court held a hearing for the purpose of construing disputed terms in the claims of United States Patents No. 5,341,457 ("the '457 patent") and No. 5,627,938 ("the '938 patent"). After consideration of the arguments and evidence presented by the parties and the relevant portions of the record, the Court construes the disputed terms as set forth below.

I. BACKGROUND

On May 31, 2002, Plaintiffs ("Dolby") filed suit against Defendants ("Lucent"), seeking declaratory relief under 28 U.S.C. § 2201(a) and 2202 in the form of a judgment of invalidity and noninfringement of several of the claims of Lucent's '457 and '938 patents. Dolby alleges that Lucent has accused them of infringing the subject claims.

1 The patents describe systems and methods that may be used in compression and
2 decompression of audio signals. For example, audio signals may be converted from analog to
3 digital format. Such digitized versions usually require large amounts of data and thus a high bit
4 rate for transmission. Compression of that data is necessary in order to transmit it over the
5 Internet or store it without using prohibitive amounts of memory. The invention uses knowledge
6 of human auditory perception to code audio signals in a way that minimizes the bit rate required
7 for data transmission or storage. It does this in two ways. First, it codes some audio data with
8 less accuracy depending on the extent to which the signal is perceptible. Second, it may
9 eliminate unnecessary or imperceptible data. In both approaches, the invention may reduce data
10 corresponding to components of an auditory signal that are "masked" by other components of the
11 signal.

12 The '457 patent, entitled "Perceptual Coding of Audio Signals," describes a storage
13 medium and methods for compressing audio signals by reducing the amount of data that
14 represents sounds that would be masked (or rendered minimally perceptible or imperceptible to
15 the human ear) by other frequencies. Specifically, it describes a method for implementing a
16 "noise masking threshold" that varies depending on the audio signal's "tonality value." Audio
17 signals are characterized based on the extent to which they are composed of "noise-like" and
18 "tone-like" qualities. A noise masking threshold is determined using the tonality value.
19 Compression is achieved by retaining audio signals above that threshold and by using the
20 threshold to determine the accuracy of the coding of those retained signals. Signals close to the
21 threshold are coded with less accuracy (and, concomitantly, more quantizing noise) and signals
22 farther above the threshold are coded with greater accuracy.

23 The '938 patent, entitled "Rate Loop Processor for Perceptual Encoder/Decoder,"
24 generally describes a similar method. However, it also includes a second basis for data
25 reduction: the "absolute hearing threshold." This threshold is an empirically determined value
26 below which certain sounds cannot be heard. Because such signals cannot be heard, data
27 corresponding to them can be eliminated, thus reducing the digital information required to
28 transmit or store the auditory signal. The '938 patent also claims an iterative process to reduce

1 the required bit rate. The invention may repeat its compression computations until the bit rate
2 used approaches the bit rate available, thus maximizing the quality of the signal while keeping
3 the bit rate below an acceptable level. Finally, the '938 patent claims a decoder, which may
4 convert the compressed data into a "time domain signal."

5 The '457 patent is a continuation of an application that was filed on December 30, 1988.
6 The '457 patent issued with seventeen claims on August 23, 1994. The parties dispute the
7 construction of numerous terms of independent claims 1, 10, and 17, as well as terms of
8 dependent claims 5, 6, and 12. The '938 patent is a continuation of an application that was filed
9 on March 2, 1992. The '938 patent issued with four claims on May 6, 1997. The '938 patent
10 incorporated by reference the original application that resulted in the '457 patent. The parties
11 dispute the construction of all of the claims.

12 13 II. APPLICABLE LAW

14 Claim construction is a question of law to be decided by the Court. *Markman v.*
15 *Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996). When
16 assessing claim meaning the Court must ask what a person having ordinary skill in the art would
17 understand the claim language to mean at the time of the invention. *DeMarini Sports, Inc. v.*
18 *Worth, Inc.*, 239 F.3d 1314, 1324 (Fed. Cir. 2001). The Court must look first to the intrinsic
19 evidence of record: the patent claims, the specification, and, if in evidence, the prosecution
20 history. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The general
21 rule is that claim terms are to be given their ordinary and accustomed meaning. *Johnson*
22 *Worldwide Associates v. Zebco Corp.*, 175 F.3d 985, 989 (Fed. Cir. 1999). However, the
23 patentee may choose to be its own lexicographer and may use terms in a manner other than their
24 ordinary meaning so long as the special definition is stated clearly in the patent specification or
25 file history. *Vitronics*, 90 F.3d at 1582. The specification acts as a dictionary when it expressly
26 defines terms used in the claims or when it defines terms by implication, and is considered to be
27 "the single best guide to the meaning of a disputed term." *Id.*

28 In most situations, analysis of the intrinsic evidence will resolve any ambiguity regarding

1 a disputed claim term. *Id.* at 1583. In such circumstances, the Court may not rely on extrinsic
2 evidence. *Id.* However, where the intrinsic evidence is ambiguous as to a disputed term or the
3 scope of the invention, the Court may turn to extrinsic evidence such as dictionaries, expert
4 testimony, prior art, technical treatises, and inventor testimony. *Id.* at 1584. Such evidence may
5 be used to help the Court understand the claims but may not be used to vary or contradict the
6 claim language. *Id.*

7 As a general claim construction principle, limitations found only in the written
8 description of the specification of a patent should not be imported or read into a claim. *In re*
9 *Donaldson*, 16 F.3d 189, 195 (Fed. Cir. 1994); *Laitram Corp. v. NEC Corp.*, 163 F.3d 1342,
10 1347 (Fed. Cir. 1998). An exception applies if a claim is expressed in “means plus function” or
11 “step plus function” format in accordance with 35 U.S.C. § 112, ¶ 6, which states:

12 An element in a claim for a combination may be expressed as a means or a step for
13 performing a specified function without the recital of structure, material, or acts in
14 support thereof, and such claim shall be construed to cover the corresponding
15 structure, material, or acts described in the specification and equivalents thereof.

16 35 U.S.C. § 112, ¶ 6. The first step in construing a means-plus-function limitation is to identify
17 the function of the limitation recited in the claim. *Texas Digital Systems, Inc. v. Telegenix, Inc.*,
18 308 F.3d 1193, 1208 (Fed. Cir. 2002). The next step is to identify the corresponding structure set
19 forth in the written description necessary to perform that function. *Id.* “Structure disclosed in
20 the specification is ‘corresponding’ structure only if the specification or prosecution history
21 clearly links or associates that structure to the function recited in the claim.” *Id.* (quoting *B.*
22 *Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997)). Corresponding
23 structure is limited to that necessary to perform the recited function, and its structural
24 equivalents. *Micro Chemicals, Inc. v. Great Plains Chem. Co.*, 194 F.3d 1250, 1257-58 (Fed.
25 Cir. 1999).

26 In “the context of method claims, the use of the term ‘steps for’ signals the drafter’s intent
27 to invoke § 112, paragraph 6.” *Masco Corp. v. U.S.*, 303 F.3d 1316, 1326 (Fed. Cir. 2002).
28 However, the mere use of “steps for” language does not necessarily mean that § 112, paragraph 6
applies. Moreover, 35 U.S.C. § 112, ¶ 6 is “implicated only when steps *plus function* without

acts are present.” *O.I. Corp. v. Tekmar Co., Inc.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). Thus, process or method claims consisting of steps do not implicate 35 U.S.C. § 112, ¶ 6. As the Federal Circuit stated: “If we were to construe every process claim containing steps described by an ‘ing’ verb . . . into a step-plus-function limitation, we would be limiting process claims in a manner never intended by Congress.” *Id.*

III. DISCUSSION

A. Disputed terms of claim 1 of the ‘457 patent.

1. Disputed terms.

The text of Claim 1 is set forth below, with the disputed terms highlighted in bold type.

1. A method of processing an ordered time sequence of audio signals partitioned into a set of ordered blocks, each said block having a discrete frequency spectrum comprising a first **set of frequency coefficients**, the method comprising, for each of said blocks, the steps of:

(a) grouping said first **set of frequency coefficients** into at least one group, each group comprising at least one frequency coefficient;

(b) generating at least one **tonality value**, each group having an associated tonality value, said at least one **tonality value reflecting the degree to which said time sequence of audio signals comprises tone-like quality**;

(c) **generating at least one noise masking threshold**, each said at least one **noise masking threshold being based upon at least a portion of said at least one tonality value**; and

(d) **quantizing** at least one frequency coefficient in said at least one group, said quantizing **based upon** said at least one **noise masking threshold**.

2. Analysis.

a. “set of frequency coefficients”

Lucent asserts that this element should be construed as a “set of values that represent the frequency domain representation of the audio signal.” Dolby argues that the correct construction

1 is “a set of values obtained from an analysis filter bank that correspond to spectral components of
2 the input signal.” Lucent proposes a definition of “frequency coefficients,” while Dolby seeks a
3 construction that describes the method for obtaining such coefficients. Lucent would agree to the
4 following version of Dolby’s proposal: “set of values that correspond to spectral components of
5 the input signal.” Hearing, October 15, 2003, Slide Hall7.

6 The meaning of “frequency coefficient” is not clear from the claim language alone. The
7 claim language indicates that the audio signals are divided into time increments, each of which is
8 represented as a frequency spectrum comprising “frequency coefficients.” However, the
9 language never defines what “frequency coefficients” are. Frequency coefficients could be
10 values that are measured at different frequencies, or they simply could be the frequency values
11 themselves. If they are the former, the claim does not indicate what is measured at each
12 frequency in the “frequency spectrum.” The claim conceivably could include every possible
13 measurement made at a frequency, or it could refer only to “power.” Accordingly, the Court
14 must look elsewhere to define this vague claim language.

15 The parties have not pointed to any intrinsic evidence that defines “coefficient.”
16 However, the parties have provided two dictionary definitions: (1) a constant factor of a product
17 (for example, the “2” in the equation “ $2x=y$ ”) or (2) a number that serves as a measure of some
18 property or characteristic. *See Webster’s Ninth New Collegiate Dictionary*. In the context of the
19 subject patents, the latter definition is more appropriate for this element of claim 1. No part of
20 the discussion of frequency coefficients includes “factors” or “division.” Instead, “coefficient”
21 refers to a component of the frequency spectrum. That is, “coefficient” is better understood as a
22 measure of some property or characteristic of the audio signal at a particular frequency.

23 Dolby admits that frequency coefficients “correspond to spectral components of the input
24 signal,” while Lucent contends that they “represent the frequency domain representation of the
25 audio signal.” While neither of these proposed constructions is entirely clear, both indicate that
26 the frequency coefficients may vary according to time and frequency; that is, they are not the
27 frequencies themselves. Both parties conceded as much in their presentations before the Court
28 on October 15, 2003. Similarly, Lucent’s expert witness, Dr. Nikil Jayant states: “Each of these

1 values, or “coefficients,” indicates the amplitude or intensity of the audio signal at a particular
2 frequency.” Kellman Decl., Ex. D, p. 4.

3 The claim language does not specify what exactly is measured at each unit of time and
4 frequency. The Court must look to the specification to clarify this issue, without importing any
5 additional limitations. Although the specification does not expressly define “frequency
6 spectrum,” it does state that at a discrete time point an audio signal is “fast-Fourier transformed
7 in order to present it as a function of frequency.” ‘457:3/3-4. The specification makes clear that
8 the frequency spectrum is a “complex spectrum” that includes, but is not limited to, the power
9 spectrum. ‘457:3/5-6 & 46-47. In light of the disclosure, a frequency spectrum is best
10 interpreted as a representation of a set of properties or characteristics of an audio signal, which
11 properties or characteristics correspond to discrete frequencies of that audio signal at a discrete
12 point in time. “Frequency coefficient” thus must be a value that represents a property or
13 characteristic of the frequency spectrum at a discrete range of frequencies. This reading is
14 consistent with the plain meaning of the word “coefficient” as defined above.

15 There is no persuasive rationale for accepting Dolby’s proposed construction. Nothing in
16 the claim language or the specification points to the use of an “analysis filter bank.” Dolby
17 appears to find this proposed limitation in the ‘938 patent, but it provides no justification for
18 looking to the ‘938 patent when construing this element of the ‘457 patent. There is no reason to
19 import such language into the claim meaning, especially when it would result in additional
20 limitations.

21 Accordingly, the Court construes “set of frequency coefficients” as a “set of values, each
22 of which represents a property or characteristic of an audio signal at a discrete range of
23 frequencies of that audio signal at a discrete point in time.”

24 **b. “tonality value”**

25 Lucent proposes that the Court construe this term as a “value that reflects the degree of
26 tone-like quality of the time sequence of audio signals and which varies with time.” Dolby’s
27 proposed construction is an “index which measures the noise-like or tone-like nature of a signal
28 derived from the Spectral Flatness Measure calculation described in the specification.” Dolby

1 thus asks the Court to include a limitation regarding the method by which a tonality value is
2 obtained.

3 Lucent's proposed construction is the more appropriate of the two. It addresses the
4 definition of "tonality value," not the method for obtaining such a value. The claim language
5 itself indicates that tonality value reflects the tone-like quality of an audio signal, and the
6 specification supports Lucent's view. For example, the inventors use the Spectral Flat Measure
7 to "estimate the tonality of signals." '457:5/12-13. They also use the Spectral Flat Measure to
8 "determine the noise-like or tone-like nature of the signal." '457:4/139-40. Thus, tonality of the
9 signals is the tone-like or noise-like nature of the signal. The specification also describes
10 different types of signals, which vary in their "tonality" according to the extent to which they are
11 "tone-like." '457:5/12-13. It is appropriate to characterize a tonality value as a measure of a
12 signal's tone-like or noise-like quality.¹

13 Dolby's proposed construction would import inappropriate limitations into the subject
14 claim. Nothing in the claim requires that the "tonality value" be obtained by a particular method.
15 Although the patent specification describes the use of a "Spectral Flatness Measure" to derive the
16 tonality value, such a limitation does not appear in the claim language. Moreover, Dolby's
17 argument that "tonality value" is imprecise and conveys no clear meaning is incorrect. Dolby
18 again focuses on *how* the tonality value is measured. For example, it cites its expert witness as
19 saying "anything . . . [can be] a measure of it." Responsive Brief, p. 6. However, when that
20 same witness was asked "it's your understanding . . . that the term 'tonality' is a clearly
21 understood concept?," he stated: "The concept is clearly understood. I said at the beginning it's
22 a degree to which something resembles a tone." Fisher Decl., Ex. D (Hall Depo. at 119:9-16).

23 Even if the method of measuring tonality value were considered part of the claim
24 language, nothing in the specification requires limitation of the claim to the disclosed Spectral
25 Flatness Measure method. Dolby points out that in some instances limitations from the
26

27 ¹ At oral argument, Lucent agreed that it would be proper to add the words "noise-like" to
28 the construction of "tonality value."

1 specification may be imported into a claim. In such instances, the Court “looks to whether the
2 specification refers to a limitation only as part of less than all possible embodiments or whether
3 the specification read as a whole suggests that the very character of the invention requires the
4 limitation be a part of every embodiment.” *Alloc Inc. v. International Trade Commission*, 342
5 F.3d 1361, 1370 (Fed. Cir. 2003). Where “the specification makes clear at various points that the
6 claimed invention is narrower than the claim language might imply, it is entirely permissible and
7 proper to limit the claim.” *Id.* In this case, however, the specification does not make clear that
8 the method used to measure “tonality value” is limited to the Spectral Flatness Measure. In fact,
9 the specification anticipates other methods. For example, it states: “In practice, the use of the
10 SFM to estimate the tonality of signals is useful.” ‘457:5/12-13. Finally, as Dolby points out, an
11 explicit reference for the “Spectral Flatness Measure” was omitted from the claim language
12 during prosecution of the patent, and the Examiner specifically allowed more inclusive claim
13 language that did not include a method, let alone a specific method. Lucent does note correctly
14 that the Examiner allowed the final claim language in part because other claim language “stresses
15 that . . . tonality varies according to changes over time.” Kellman Decl., Ex. E (Office Action,
16 p.1). Based on the foregoing discussion, the Court construes this element as the “value that
17 reflects the tone-like or noise-like quality of an audio signal and which varies with time.”

18 **c. “tonality value reflecting the degree to which said time sequence of**
19 **audio signals comprises tone-like quality”**

20 In the parties’ Joint Claim Construction Statement, Dolby asks the Court to construe this
21 language as “either the tonality value increases as the time sequence of audio signals becomes
22 more tone-like or, alternatively, the tonality value decreases as the time sequence of audio signals
23 becomes more tone-like.” However, in its Responsive Brief Dolby changes its proposal to: “a
24 continuum such that either the tonality value increases as the time sequence of audio signals
25 becomes more tone-like or, alternatively, the tonality value decreases as the time sequence of
26 audio signals becomes more tone-like.” As with the preceding element, Lucent proposes: “value
27 that reflects the degree of tone-like quality of the time sequence of audio signals and which varies
28 with time.”

1 Lucent points out that the claim language does not require the tonality value to change
2 with each change of tone-like quality. Rather, because the tonality value merely reflects tone-like
3 quality, several values of tone-like quality could be represented by a constant tonality value. The
4 claim language supports Lucent's argument. Rather than stating that tonality value must change
5 with tone-like quality, it states that it reflects the tone-like quality degree. Although "degree"
6 might more appropriately conjure up a continuum and not a binary measurement, "degree" in the
7 claim refers to "tone-like quality" and not "tonality value." Thus, even if the Court were to
8 accept Dolby's argument regarding the meaning of degree, only the tone-like quality variable
9 would be represented as a continuum. The "tonality value" could be a binary or some other type
10 of reflection of the tone-like quality continuum.²

11 Accordingly, the Court construes this element as "value that reflects the degree of tone-
12 like or noise-like quality of an audio signal and which varies with time."

13 **d. "generating at least one tonality value, each group having an**
14 **associated tonality value, said at least one tonality value reflecting the**
15 **degree to which said time sequence of audio signals comprises tone-**
16 **like quality"**

17 Dolby asks the Court to construe this language as "generating at least one index which
18 measures the noise-like or tone-like nature of a signal derived from the Spectral Flatness
19 Measure calculation described in the specification, where the index increases as the time
20 sequence of audio signals becomes more tone-like or, alternatively, the index decreases as the
21 time sequence of audio signals becomes more tone-like." Lucent proposes: "generating one or
22 more values that reflect the degree of tone-like quality of the time sequence of audio signals and
23 which vary with time." The parties do not support their constructions in their papers.

24 The Court has construed "tonality value" and "tonality value reflecting the degree to
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26 ² In light of the clear claim language, and the Court's construction of "tonality value," the
27 Court need not look to the specification. However, the Court notes that the specification
28 describes a scheme whereby the tonality value does not change between tone-like quality values
of -60dB to -75dB. '457:4/58-63.

1 which said time sequence of audio signals comprises tone-like quality” in the preceding sections
2 of this Order. “Group” clearly refers to subpart (a) of claim 1, which claims grouping of
3 frequency coefficients representing a portion or all of an audio signal. Accordingly, the Court
4 construes this element as “generating, for each group of frequency coefficients representing a
5 portion or all of an audio signal, at least one value that reflects the degree of tone-like or noise-
6 like quality of the portion of the audio signal represented by that group of frequency coefficients
7 and which varies with time.”³

8 **e. “noise masking threshold”**

9 Other than indicating that “noise” is masked, the claim language of this clause provides
10 little insight into the meaning of the term. The Court must consult the intrinsic and, if necessary,
11 extrinsic evidence to clarify this ambiguous language. Lucent’s proposed construction—“signal-
12 dependent, perceptually-based auditory threshold that estimates the level below which signals
13 will be perceptually masked”—suggests that any signal, not just noise, may be masked.
14 However, neither the claim language nor the specification supports such a broad construction.
15 The claim language indicates that “noise” is masked. Although the specification does mention
16 “masking of signals by signals,” ‘457:4/9, it does so in the context of masking in general rather
17 than “noise masking” in particular. This element therefore must be limited to masking of noise,
18 not masking of signals in general.

19 The claim language does not indicate clearly what “noise” is masked or even what
20 “noise” means. The specification discusses masking of quantizing noise, describing the
21 invention as a “technique for the masking of quantizing noise in the coding of audio signals.”
22 ‘457:abstract. It also indicates that a “signal-dependent threshold of masking” is the level below
23 which “quantizing noise” is inaudible. ‘457:1/36-37. “Quantization noise” is “the inherent
24 distortion introduced in the process of quantization.” IEEE Standard Dictionary of Electrical and
25 Electronics Terms, 2nd ed. In describing the psychoacoustic threshold, the specification refers to
26 an article by one of the inventors. That article describes a process that “estimates a threshold that
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28 ³ See above Part III.A.2.a. for the definition of “frequency coefficient.”

1 represents the maximum level of *injected* noise that will be inaudible when added to the input
2 signal.” Fisher Decl., Ex. DD, p.2 (J.D. Johnston, “Transform Coding of Audio Signals Using
3 Perceptual Noise Criteria,” IEEE Journal of Selected Areas in Communications, Feb. 1988)
4 (emphasis added). Lucent’s expert witness, Dr. Jayant, explains that the inventors used “the
5 results from human auditory perception” to control and manage “the distortion introduced by the
6 coding process so that it would be inaudible to most people. In other words the distortion would
7 be ‘masked’ by the audio signal itself.” Kellman Decl., Ex. D, p. 3 (Jayant Depo.). Dr. Jayant
8 also states that the masking threshold is used “to estimate the amount of quantization noise that
9 can be tolerated without perceived distortion,” *id.* at 8, and that “[n]oise, in this case, refer[s] to
10 the signal distortion caused in the compression process.” Fisher Decl., Ex. F (Jayant Depo. at
11 46:3-4). Finally, Lucent noted at the hearing that the noise masking threshold “rules the
12 quantization level,” Hearing, October 15, 2003, Slide Hall38, and that “[q]uantization introduces
13 noise into the signal and you try to quantize so that any resulting distortion in the signal for noise
14 will be underneath the masking curve,” Hearing, October 15, 2003, Transcript p. 15. In the
15 context of the claim language itself (which states “*noise* masking threshold”), the specification,
16 and this extrinsic evidence, the noise that is masked must be the quantizing noise, that is, the
17 noise that is introduced (or “injected”) by the coding (or compression) process.

18 The specification suggests that “masking” means “imperceptible to the human auditory
19 system.” It is clear that the purpose of the invention is to minimize perception of such noise by
20 the human ear: “The primary goal . . . is to implement the use of a coding threshold that is
21 adjusted in a way that is responsive to the sensitivities of the human ear.” ‘457:2/46-49. The
22 specification also describes a method that uses “psychoacoustic processing” for determining the
23 threshold. ‘457:1/35. The remainder of the specification describes the inventors’ improvement,
24 which is a new and different method for determining “a better psychoacoustic threshold.”
25 ‘457:1/48-49. Additionally, the evidence discussed in the prior paragraph relating to quantizing
26 noise characterizes noise masking in terms of perceptibility of that noise by the human auditory
27 system. The proper construction of this element thus is “a psychoacoustically derived estimated
28

1 value below which quantizing noise is not perceived by the human auditory system.”⁴

2 Lucent’s proposal adds the limitation of signal dependency. However, nothing in the
3 claim language refers to signal dependency. Although the inventors cite a reference that
4 discusses a “signal-dependent threshold of masking,” ‘457:1/36-37, neither the specification nor
5 the claim indicates that the limitation of signal dependency should be read into the claim. While
6 it might be true that the masking threshold necessarily varies according to the audio signal,
7 Opening Brief, p. 11, the claim does not include such language.

8 Dolby proposes the following construction: “level that varies as a function of frequency
9 across the bandwidth of a signal below which sounds are made inaudible or are ‘masked’ by
10 louder spectral components in a signal.” The Court will not read such limitations into the claim.
11 Nothing in the claim language indicates that the noise masking threshold varies according to
12 frequency. The specification describes both noise masking thresholds that vary across
13 frequencies and those that are constant. See ‘457:5/55-60.

14 The Court construes “noise masking threshold” as “a psychoacoustically derived
15 estimated value below which quantizing noise is not perceived by the human auditory system.”

16 **f. “generating at least one noise masking threshold”**

17 Dolby asks the Court to construe this language as “generating at least one level that varies
18 as a function of frequency across the bandwidth of a signal below which sounds are made
19 inaudible or are ‘masked’ by louder spectral components in a signal.” Lucent proposes:
20 “generating one or more signal-dependent, perceptually-based auditory thresholds that estimate
21 the level below which signals will be perceptually masked.” The parties do not support their
22 constructions in their papers. For the reasons stated in the analysis supporting the Court’s
23 construction of the preceding element, the Court construes this element as “generating at least
24 one psychoacoustically derived estimated value below which quantizing noise is not perceived by
25

26 ⁴ The term “estimated” is included to indicate that thresholds are derived empirically and
27 there may be a small group of people who can perceive the auditory signal, even below the
28 threshold. For example, the ‘457 patent discusses the “masking estimates” from various
publications. ‘457:4/3-15.

1 the human auditory system.”

2 **g. “being based upon”**

3 Lucent asks the Court to construe this language as “using as a basis.” Dolby does not
4 propose a construction. Nothing in the specification imparts a special meaning to these words.
5 The plain meaning of “based upon” is “having as its basis.” For example, the verb form of
6 “base” is “to place or establish on a base or basis; ground.” Random House Dictionary of the
7 English Language, 2nd ed., unabridged. “Basis” is defined as “anything upon which something
8 is based; fundamental principle; groundwork,” *id.*, and “something on which something else is
9 established or based.” Webster’s Ninth New Collegiate Dictionary. The claim language and the
10 specification support this construction. For example, it is clear that the noise masking threshold
11 is determined, at least in part, by the tonality value. That is, tonality value is a component in the
12 determination of the noise masking threshold; the tonality value forms a basis for the noise
13 masking threshold. Accordingly, the Court construes this element as “having as its basis.”

14 **h. “noise masking threshold being based upon at least a portion of said**
15 **at least one tonality value”**

16 Dolby argues that, because the claim includes the language “being based upon,” this is a
17 step-plus-function claim pursuant to 35 U.S.C. § 112, ¶ 6. This argument is without merit. Not
18 only does the claim not use the language “steps for,” but there is no indication that a function is
19 described in terms of steps. 35 U.S.C. § 112, ¶ 6 is “implicated only when steps *plus function*
20 without acts are present.” *O.I. Corp. v. Tekmar Co., Inc.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997).
21 Instead, the claim language expressly limits “noise masking threshold” to a subset derived, at
22 least in part, from a “tonality value.” The Court will not limit this claim element to the
23 embodiment described in the specification.

24 Moreover, the claim language fairly accurately captures the disclosed invention. The
25 noise masking threshold is “based upon at least a portion of said at least one tonality value.” The
26 tonality value is the “value that reflects the tone-like or noise-like quality of an audio signal and
27 which varies with time.” For example, a disclosed noise masking threshold is comprised of two
28

1 thresholds depending on whether the signal involves noise masking tone or tone masking noise.
2 '457:4/29-41. Different formulas for determining the noise masking threshold are used for each.
3 The extent to which a signal is noise-like or tone-like is reflected in its "tonality value." Thus,
4 the noise masking threshold varies depending on tonality value.

5 The Court construes this element as "a psychoacoustically derived estimated value below
6 which quantizing noise is not perceived by the human auditory system and which has as its basis
7 at least one portion of said value that reflects the tone-like or noise-like quality of an audio signal
8 and which varies with time."

9
10 **i. "quantizing"**

11 Lucent proposes: "representing a value between certain limits by a value chosen from a
12 limited number of values selected to cover the range." Lucent bases its construction on the
13 definition found in the McGraw-Hill Electronics Dictionary, 6th ed. Dolby proposes: "dividing
14 a range of values into a finite number of subranges, each of which is represented by an assigned
15 value within the subrange." It bases its construction on the IEEE Standard Dictionary of
16 Electrical and Electronics Terms, 2nd ed. The parties seem to agree that the value that represents
17 the quantized value must be from within the subrange that contains the quantized value; their
18 only dispute concerns the clarity of the construction. Accordingly, the Court construes this
19 element as "dividing a range of values into a finite number of subranges, each subrange
20 represented by an assigned value from within the subrange."

21
22 **B. Disputed terms of claim 5 of the '457 patent.**

23 **1. Disputed elements.**

24 The text of Claim 5 is set forth below, with the disputed terms highlighted in bold type.
25
26 "5. The method of claim 1 wherein each said block is representable by a number of bits, said
27 number of bits having a **predetermined range**, said **quantizing** is based on said number of bits."
28

1 **2. Analysis.**

2 **a. "predetermined range"**

3 Lucent proposes: "predefined limits." Dolby proposes: "the range is determined in
4 advance but is otherwise unspecified." Dolby admits that "[n]othing about Claim 5 specifies the
5 range to which the 'predetermined range' of bits must be confined, or states anything else about
6 the range." Responsive Brief, p. 18. Thus, there is no additional limitation requiring further
7 specification. The Court will not read an additional limitation into the claim and will construe
8 the element as "predefined limit."

9 **b. "quantizing"**

10 For the reasons stated above with respect to claim 1, the Court construes this element as
11 "dividing a range of values into a finite number of subranges, each subrange represented by an
12 assigned value from within the subrange."
13

14
15 **C. Disputed term of claim 6 of the '457 patent.**

16 **1. Disputed element.**

17 The text of Claim 6 is set forth below, with the disputed terms highlighted in bold type.

18
19 6. The method of claim 5 wherein said step of quantizing said at least one
20 frequency coefficient in said at least one group comprises quantizing all frequency
21 coefficients in said first set of frequency coefficients and wherein said method
further comprising, for each block, the steps of:

22 (a) generating an amount of bits needed to represent said first **set of frequency**
23 **coefficients** in a quantized form;

24 (b) comparing said amount of bits to said number of bits;

25 (c) adjusting each said at least one noise masking threshold; and

26
27 (d) repeating set (d) of claim 1 and steps (a) through (c) until said amount of bits
28 is within said predetermined range of said number of bits.

2. **Analysis—“set of frequency coefficients”**

For the reasons stated above with respect to claim 1, the Court construes this element as a “set of values, each of which represents a property or characteristic of an audio signal at a discrete range of frequencies of that audio signal at a discrete point in time.”

D. Disputed terms of claim 10 of the ‘457 patent.

1. Disputed elements.

The text of Claim 10 is set forth below, with the disputed terms highlighted in bold type.

10. A storage medium manufactured in accordance with a process comprising the steps of:

(a) processing an ordered time sequence of audio signals partitioned into a set of ordered blocks, each said block having a discrete frequency spectrum comprising a first **set of frequency coefficients**; and

(b) for each of said blocks:

(1) grouping said first **set of frequency coefficients** into at least one group, each group comprising at least one frequency coefficient;

(2) **generating at least one tonality value, each group having an associated tonality value, said at least one tonality value reflecting the degree to which said time sequence of audio signals comprises tone-like quality;**

(3) **generating at least one noise masking threshold, each said at least one noise masking threshold being based upon at least one tonality value;**

(4) **quantizing** at least one frequency coefficient in said at least one group resulting in a set of quantized frequency coefficients, said quantizing **based upon** said at least one **noise masking threshold**;

(5) **applying a recording signal to said storage medium**, said recording signal comprising signals representing said set of quantized frequency coefficients; and

(6) **recording said recording signal onto said storage medium.**

1 **2. Analysis.**

2 **a. “set of frequency coefficients”**

3 For the reasons stated above with respect to claim 1, the Court construes this element as a
4 “set of values, each of which represents a property or characteristic of an audio signal at a
5 discrete range of frequencies of that audio signal at a discrete point in time.”

6 **b. “tonality value”**

7 For the reasons stated above with respect to claim 1, the Court construes this element as
8 the “value that reflects the tone-like or noise-like quality of an audio signal and which varies with
9 time.”

10 **c. “tonality value reflecting the degree to which said time sequence of**
11 **audio signals comprises tone-like quality”**

12 For the reasons stated above with respect to claim 1, the Court construes this element as
13 “value that reflects the degree of tone-like or noise-like quality of an audio signal and which
14 varies with time.”

15 **d. “generating at least one tonality value, each group having an**
16 **associated tonality value, said at least one tonality value reflecting the**
17 **degree to which said time sequence of audio signals comprises tone-**
18 **like quality”**

19 For the reasons stated above with respect to claim 1, the Court construes this element as
20 “generating for each group of frequency coefficients representing a portion or all of an audio
21 signal at least one value that reflects the degree of tone-like or noise-like quality of the portion of
22 the audio signal represented by that group of frequency coefficients and which varies with time.”

23 **e. “noise masking threshold”**

24 For the reasons stated above with respect to claim 1, the Court construes this element as
25 “a psychoacoustically derived estimated value below which quantizing noise is not perceived by
26 the human auditory system.”

27 **f. “generating at least one noise masking threshold”**

28 For the reasons stated above with respect to claim 1, the Court construes this element as

1 “generating at least one psychoacoustically derived estimated value below which quantizing
2 noise is not perceived by the human auditory system.”

3 **g. “being based upon”**

4 For the reasons stated above with respect to claim 1, the Court construes this element as
5 “having as its basis.”

6 **h. “noise masking threshold being based upon at least one tonality**
7 **value”**

8 For the reasons stated above with respect to claim 1, the Court construes this element as
9 “a psychoacoustically derived estimated value below which quantizing noise is not perceived by
10 the human auditory system and which has as its basis at least one portion of said value that
11 reflects the tone-like or noise-like quality of an audio signal and which varies with time.”

12 **i. “quantizing”**

13 For the reasons stated above with respect to claim 1, the Court construes this element as
14 “dividing a range of values into a finite number of subranges, each subrange represented by an
15 assigned value from within the subrange.”

16 **j. “applying a recording signal to said storage medium”**

17 Lucent proposes: “adapting a recording signal for the purpose of recording the signal to a
18 storage medium.” Dolby proposes: “putting a recording signal on said storage medium.”

19 It is apparent from Exhibit H of Lucent’s Declaration of Alan S. Kellman that the parties
20 rely on different definitions of “apply.” Lucent cites the second definition: “To put to or adapt
21 for a special use[, for example:] applies all her money to her mortgage.” American Heritage
22 Dictionary of the English Language, 4th ed. Dolby’s construction is captured in the first
23 definition: “To bring into nearness or contact with something; put on, upon, or to.” *Id.* The
24 parties have not pointed to, and the Court has not found, any elucidating intrinsic evidence.

25 The Court does find, however, Dolby’s construction more persuasive. “Applying” the
26 recording signal is the process of transferring the signal to the storage medium. The claim
27 language indicates that the signal is (1) applied to and then (2) recorded onto the storage medium.
28 The plain meaning of the first step is that the signal is brought into contact with the storage

1 medium. This interpretation is consistent with at least one plain meaning of “apply.” For
2 example, apply means “to bring into physical contact with or close proximity to” and “to place in
3 contact with; lay or spread on.” Random House Unabridged Dictionary, 2nd ed. In the context
4 of this invention, bringing data representing an audio signal into physical contact with a storage
5 medium means transferring the signal to the storage medium. Nothing in the claim or
6 specification indicates that “applying” the recording signal includes a step of “adaptation.” The
7 Court construes this element as “transferring a recording signal to said storage medium.”

8 **k. “recording said recording signal onto said storage medium”**

9 Lucent proposes: “setting down the recording signal on the storage medium for
10 preservation.” Dolby proposes: “fixing the recording signal onto the storage medium after it has
11 been put on the medium.” Lucent’s proposal more accurately describes the preceding element.
12 An appropriate construction results from a hybrid of the two proposals. The preceding element
13 (applying) involves transfer of the signal to the storage medium such that it is in contact with it.
14 The recording element involves fixing the signal onto the storage medium so that it is preserved.
15 Accordingly, the Court construes this element as “fixing the recording signal onto the storage
16 medium for preservation.”

17
18 **E. Disputed Term of Claim 12 of the ‘457 patent.**

19 **1. Disputed element.**

20 The text of Claim 12 is set forth below, with the disputed terms highlighted in bold type.
21 “12. The method of claim 10 wherein said storage medium is a **digital storage means.**”

22 **2. Analysis—“digital storage means”**

23 Lucent proposes: “any device that stores digital information.” Dolby argues that,
24 because it includes the word “means,” this element invokes 35 U.S.C. § 112, ¶ 6. However, a
25 claim is not necessarily a means-plus-function claim simply because the word “means” is used.
26 *Cole v. Kimberly-Clark Corp.*, 102 F.3d 524, 531 (Fed. Cir. 1996). 35 U.S.C. § 112, ¶ 6 applies
27 only to an element that is “expressed as a means . . . for performing a specified function without
28

1 the recital of structure . . . in support thereof,” *id.*, and which does not “recite a definite structure
2 which performs the described function,” *Cole*, 102 F.3d at 531. This element does not claim a
3 means for performing a function. Moreover, it recites a structure: the “digital storage means.”
4 Accordingly, the Court construes this element as “a device that stores digital information.”

5
6 **F. Disputed Terms of Claim 17 of the ‘457 patent.**

7 **1. Disputed elements.**

8 The text of Claim 12 is set forth below, with the disputed terms highlighted in bold type.

9
10 17. A method for generating signals representing an ordered time sequence of
11 audio signals partitioned into a set of ordered blocks, each said block having a
12 discrete frequency spectrum comprising a first **set of frequency coefficients**, the
method comprising, for each of said blocks, the steps of:

13 (a) grouping said first **set of frequency coefficients** into a plurality of groups,
14 each group in said plurality of groups representing a **critical band of frequencies**
and comprising at least one frequency coefficient;

15 (b) **generating a tonality value for each said group in said plurality of groups**
16 **of frequency coefficients, said tonality values reflecting the degree to which**
17 **said time sequence of audio signals comprises tone-like quality;**

18 (c) **generating a noise masking threshold** for each said group in said plurality of
19 groups of frequency coefficients, each said **noise masking threshold being based**
20 **upon said tonality value for the respective group;** and

21 (d) **quantizing** each frequency coefficient in said at least one frequency
22 coefficient in each said group, said quantizing **being based upon said noise**
23 **masking threshold** associated with said group and a predetermined number of
bits.

24 **2. Analysis.**

25 **a. “set of frequency coefficients”**

26 For the reasons stated above with respect to claim 1, the Court construes this element as a
27 “set of values, each of which represents a property or characteristic of an audio signal at a
28 discrete range of frequencies of that audio signal at a discrete point in time.”

1 **b. “critical band of frequencies”**

2 Lucent proposes: “frequency band within which the masking behavior of the human ear
3 remains approximately constant.” Dolby proposes: “frequency bands of varying width of the
4 auditory spectrum where the masking behavior of the human ear remains approximately
5 constant.”

6 Evidently Dolby seeks to add a limitation constraining the width of the critical bands to
7 “one Bark.” However, Dolby’s proposed construction does not include the term “Bark,” nor is
8 there any basis for adding either the desired or suggested limitation. The claim language says
9 nothing about limiting a critical band to varying widths or the range of one Bark. Referring to
10 the specification for clarification of “critical band,” it is clear that a critical band is one “where
11 the masking behavior of the human ear remains approximately constant.” ‘457:3/18-19. While it
12 is true that this same portion of the specification discusses the Bark Spectrum, the claim language
13 need not be defined by reference to one particular type of critical band spectrum. The Court will
14 not import additional limitations into the claim and will construe this element as “frequency band
15 within which the masking behavior of the human ear remains approximately constant.”

16 **c. “tonality value”**

17 For the reasons stated above with respect to claim 1, the Court construes this element as
18 the “value that reflects the tone-like or noise-like quality of an audio signal and which varies with
19 time.”

20 **d. “tonality values reflecting the degree to which said time sequence of**
21 **audio signals comprises tone-like quality”**

22 For the reasons stated above with respect to claim 1, the Court construes this element as
23 “value that reflects the degree of tone-like or noise-like quality of an audio signal and which
24 varies with time.”

1 e. **“generating a tonality value for each said group in said plurality of**
2 **groups of frequency coefficients, said tonality values reflecting the**
3 **degree to which said time sequence of audio signals comprises tone-**
4 **like quality”**

5 For the reasons stated above with respect to claim 1, the Court construes this element as
6 “generating for each group of frequency coefficients representing a portion of an audio signal a
7 value that reflects the degree of tone-like or noise-like quality of the portion of the audio signal
8 represented by that group of frequency coefficients and which varies with time.” The
9 construction is changed slightly from that of claim 1 because this claim is limited to a plurality of
10 groups.

11 f. **“noise masking threshold”**

12 For the reasons stated above with respect to claim 1, the Court construes this element as
13 “a psychoacoustically derived estimated value below which quantizing noise is not perceived by
14 the human auditory system.”

15 g. **“generating a noise masking threshold”**

16 For the reasons stated above with respect to claim 1, the Court construes this element as
17 “generating a psychoacoustically derived estimated value below which quantizing noise is not
18 perceived by the human auditory system.” The construction is changed slightly because this
19 claim language is not limited to “at least one.”

20 h. **“being based upon”**

21 For the reasons stated above with respect to claim 1, the Court construes this element as
22 “having as its basis.”

23 i. **“noise masking threshold being based upon said tonality value for the**
24 **respective group”**

25 For the reasons stated above with respect to claim 1, the Court construes this element as
26 “a psychoacoustically derived estimated value below which quantizing noise is not perceived by
27 the human auditory system and which has as its basis said value that reflects the tone-like or
28 noise-like quality of an audio signal for the respective group and which varies with time.” The

1 construction is changed slightly because this claim language is not limited to “at least one” and is
2 limited to “the respective group.” Both the plain meaning and the context of the claim language
3 indicate that “the respective group” refers to the group of frequency coefficients for which the
4 noise masking threshold was generated.

5 **j. “quantizing”**

6 For the reasons stated above with respect to claim 1, the Court construes this element as
7 “dividing a range of values into a finite number of subranges, each subrange represented by an
8 assigned value from within the subrange.”

9
10 **G. Disputed Terms of Claim 1 of the ‘938 patent.**

11 **1. Disputed elements.**

12 The text of claim 1 is set forth below, with the disputed terms highlighted in bold type.

13 1. A method of coding an audio signal comprising:

14
15 (a) converting a time domain representation of the audio signal into a frequency
16 domain representation of the audio signal, the frequency domain representation
comprising a **set of frequency coefficients**;

17 (b) calculating a **masking threshold based upon the set of frequency**
18 **coefficients**;

19 (c) **using a rate loop processor in an iterative fashion** to determine a **set of**
20 **quantization step size coefficients** for use in encoding the **set of frequency**
21 **coefficients**, said set of quantization step size coefficients **determined by using**
the **masking threshold and an absolute hearing threshold**; and

22 (d) coding the **set of frequency coefficients based upon the set of quantization**
23 **step size coefficients**.

24 **2. Incorporation by reference.**

25
26 Lucent supports its construction of the claims of the ‘938 patent by referring to both the
27 ‘938 and ‘457 patents. Dolby argues that Lucent may not refer to the ‘457 patent because, at the
28 time the ‘938 patent application was filed, the Manual of Patent Examining Procedure (“MPEP”)

1 prohibited incorporation by reference of a patent application, and the '457 patent had not issued
2 and therefore remained an application. The MPEP at that time also prohibited incorporation by
3 reference of a "U.S. patent or application which itself incorporates 'essential material' by
4 reference." MPEP 608.01(p).

5 Lucent argues that the current version of the MPEP permits incorporation by reference of
6 a "patent application publication" and that another court in this district has permitted
7 incorporation by reference of a patent application as long as the Examiner had access to the co-
8 pending application during prosecution. *Advanced Semiconductor Materials America, Inc. v.*
9 *Applied Materials*, 922 F. Supp. 1439, 1449 (N.D. Cal. 1996). The court noted in that case that
10 the co-pending application issued, and thus became public, before issuance of the patent-in-suit.
11 The crucial issue is whether a person having ordinary skill in the art would understand what the
12 patent claims and describes. If the reference is available to the public and is referred to in the
13 patent specification, then a person having ordinary skill in the art most likely would understand
14 the claims and description.

15 Lucent's argument raises three questions. First, did the examiner have access to a co-
16 pending application that indeed described the material that Lucent now claims is incorporated by
17 reference? The '938 patent specification specifically incorporates by reference U.S. patent
18 application Ser. No. 07/292,598. That application's specification appears to be identical to that
19 of the '457 patent. *See* Fisher Decl., Ex. MM. Second, is the published '457 patent sufficient to
20 describe the invention claimed in the '938 patent to a person having ordinary skill in the art? The
21 Court will consider this question with respect to each element below. Third, does the '457 patent
22 incorporate *essential* material by reference? If so, does this fact preclude the '938 patent from
23 incorporating the '457 patent by reference? Dolby does not describe what material was
24 incorporated by reference, let alone how such material was essential. Accordingly, the Court will
25 not prohibit, generally, reference to the '457 patent when construing the claims of the '938
26 patent.

1 **3. Analysis.**

2 **a. “set of frequency coefficients”**

3 Lucent and Dolby refer to their arguments as to this term in claim 1 of the ‘457 patent.
4 (Lucent also points, without dispute by Dolby, to support in the ‘938 patent.) For the reasons
5 stated above with respect to claim 1 of the ‘457 patent, the Court construes this element as a “set
6 of values, each of which represents a property or characteristic of an audio signal at a discrete
7 range of frequencies of that audio signal at a discrete point in time.”

8 **b. “masking threshold”**

9 Lucent and Dolby refer to their arguments as to this element in claim 1 of the ‘457 patent.
10 (Lucent again points, without dispute by Dolby, to support in the ‘938 patent.) Lucent treats the
11 term “masking threshold” of the ‘938 patent in like manner as the term “noise masking
12 threshold” of the ‘457 patent, and the ‘938 patent supports such an approach. The language of
13 the ‘938 patent notes that it is “important that the coding techniques used to compress audio
14 signals do not themselves introduce offensive components or artifacts.” ‘938:2/25-27. It
15 describes a perceptual coder that “introduc[es] noise associated with quantization of information
16 bearing signals The goal is, of course, to introduce this noise in an imperceptible or benign
17 way.” ‘938:10/36-40. Finally, when describing how “to mask the quantization noise by the
18 signal,” ‘938:10/57, it discusses how “models produce an hypothetical masking threshold that
19 rules the quantization level of each spectral component,” ‘938:11/10-12. For these reasons and
20 those stated above with respect to claim 1 of the ‘457 patent, the Court construes this element as
21 “a psychoacoustically derived estimated value below which quantizing noise is not perceived by
22 the human auditory system.”

23 **c. “based upon”**

24 For the reasons stated above with respect to claim 1 of the ‘457 patent, the Court
25 construes this element as “having as its basis.”
26
27
28

1 d. **“based upon the set of frequency coefficients”**

2 Lucent and Dolby refer to their arguments regarding this element in claim 1 of the ‘457
3 patent. (Lucent also points to support in the ‘938 patent and Dolby does not dispute that
4 support.) For the reasons stated above regarding claim 1 of the ‘457 patent, the Court construes
5 this element as a “having as its basis a set of values, each of which represents a property or
6 characteristic of an audio signal at a discrete range of frequencies of that audio signal at a discrete
7 point in time.”

8 e. **“rate loop processor”**

9 Lucent defines this element as a “processor (hardware and/or software) that operates to
10 meet the required bit rate for a given application.” Dolby proposes: “processor (hardware and/or
11 software) that performs a process in a loop to meet the required bit rate for a given application.”
12 Dolby thus seeks to add “performs a process in a loop” to Lucent’s proposed construction. It
13 points out that the claim language includes the word “loop.” However, it goes even further in
14 that it asks the Court to construe the loop itself as an iterative process. It refers to Webster’s
15 dictionary and expert testimony to support its contention that “loop” is an iterative process.
16 Ultimately, Dolby seeks to impose a limitation whereby the rate loop processor must conduct at
17 least two runs of processing, that is, it must repeat.

18 Lucent argues that the rate loop processor need not repeat a loop if its first round of
19 computation concludes with a suitable result. It points to the ‘938 patent specification to support
20 this construction. For example: “The quantizer/rate loop processor 206 used in the illustrative
21 coder of FIG. 2 takes the outputs from the analysis bank and the perceptual model, and allocates
22 bits, noise, and controls other system parameters so as to meet the required bit rate for the given
23 application.” ‘938:7/16-20. It appears from this description that “rate loop processor” need not
24 perform its function by repeating its processing steps. Moreover, according to the plain meaning
25 of “loop,” even if a “loop” is performed, it need not be performed twice. Indeed, Dolby’s expert
26 witness, Dr. Brandenburg stated: “there may be rate loops where you go just once through.”
27 Fisher Decl., Ex. C (Brandenburg Depo. at 166:6-7). Accordingly, the Court construes this
28

1 element as a “processor (hardware and/or software) that operates to meet the required bit rate for
2 a given application.”

3 **f. “iterative fashion”**

4 Lucent proposes: “the process of repeating a set of instructions a specified number of
5 times or until a specific result is achieved.” This proposal tracks, identically, a dictionary
6 definition of “iteration.” American Heritage Dictionary, 4th ed. Dolby proposes: “two or more
7 times.” Both proposals refer to the plain meaning of iteration and cite dictionaries. Lucent’s
8 definition includes Dolby’s; the “process of repeating” necessarily implies “two or more times.”
9 Accordingly, the Court construes this element as “characterized by the process of repeating a set
10 of instructions a specified number of times or until a specific result is achieved.”

11 **g. “using a rate loop processor in an iterative fashion”**

12 Referring to the preceding two constructions, Lucent construes this combination as “the
13 rate loop processor be operated iteratively until an acceptable bit rate is found.” Lucent points to
14 a preferred embodiment that does not require repetition. However, Lucent itself defined
15 “iterative fashion” as including “repeating a set of instructions,” Joint Claims Construction Brief,
16 p. 15, and “iteration” as the “process of repeating a set of instructions,” Brief, p. 23. The Court
17 must adhere to the claim language if it is clear. Something is not repeated if it is performed only
18 once. Accordingly, the Court construes this element as “using a processor (hardware and/or
19 software), which operates to meet the required bit rate for a given application, to repeat a set of
20 instructions a specified number of times or until a specific result is achieved.” In other words,
21 the loop performed by the rate loop processor may be performed repeatedly until a desired result
22 is achieved.
23

24 **h. “set of quantization step size coefficients”**

25 This term does not appear in the ‘938 specification other than in the claims. Dolby
26 asserts that the term is not known to those skilled in the art (although the term “quantization step
27 size” is). Accordingly, Dolby argues that the term “quantization step size coefficient” should be
28

1 limited to what is disclosed in the specification, which, according to Dolby, is an embodiment
2 called the “utilized scale factor.” In the parties’ Joint Claim Construction Brief, Dolby proposes
3 the following construction: “set of ‘utilized scale factors’ as described in the specification.”
4 Later, in its Responsive Brief, Dolby adds the relevant language from the specification to its
5 proposed construction. Responsive Brief, p. 25. Lucent argues that the language imported by
6 Dolby describes just one embodiment of a method for obtaining the “quantization step size
7 coefficient.” Moreover, Lucent argues that “quantization step size” and “coefficient,”
8 individually, are well known terms. Lucent defines this element as a “set of values that
9 determine the sizes of the steps between quantizer levels used for encoding.”

10 Dolby impermissibly attempts to construe the term according to a method for obtaining
11 the result that the term is intended to describe. In importing language from the specification,
12 Dolby would require that the “quantization step size coefficient” be “iteratively derived by
13 interpolating between a scale factor derived from a calculated threshold of hearing . . . and a scale
14 factor derived from the absolute threshold of hearing.” ‘938:3/63-4/1. Nothing in the claim
15 language indicates that this term must be defined according to one of the ways by which it is
16 derived. “Quantization step size coefficient” (and “utilized scale factor” for that matter) may
17 mean something independent from the method for deriving them. The element should be defined
18 according to its identity and not by a method for deriving it.

19 Although the term “quantization step size coefficient” is not used in the specification, it is
20 equivalent to “scale factor,” which is described in the specification. Dolby agrees that the term is
21 equivalent at least to “utilized scale factor,” while Lucent argues that it is a factor used to
22 multiply or divide the quantization step size, Reply Brief, p. 16. In the specification, “scale
23 factors [are] used in quantizing the audio signal.” ‘938:3/55-56. Indeed, “step size” and “scale
24 factor” are closely related. For example: “The quantization process effects both spectral . . .
25 coefficients and scale factors. Spectral coefficients are clustered in bands, each band having *the*
26 *same step size or scale factor.*” ‘938:20/61-63 (emphasis added). The purpose of the invention
27 is to maximize accuracy and minimize bit rate by setting the accuracy of quantizing. *See*
28

1 '938:abstract; Fisher Decl., Ex. F (Jayant Depo. at 178:13-15). Quantizing accuracy is
2 determined in part by a scale factor or step size. *Id.* "The present invention provides a
3 mechanism for determining the scale factors to be used in quantizing the audio signal."
4 '938:3/54-56. Thus, "quantization step size coefficient" and "scale factor" relate to a factor used
5 in the quantizing process. Dr. Hall stated that he understood "quantization step size coefficients"
6 to be "something that gets used in coders that has to do with quantization step sizes." Fisher
7 Decl., Ex. D (Hall Depo. at 103:19-21). "Quantization step size" is a measure of the steps
8 between quantization levels, and "quantization step size coefficient" (or "scale factor") is a factor
9 that determines the "quantization step size."

10 Dolby's construction defines "set of quantization step size coefficients" according to only
11 one specific embodiment in the specification. Nothing in the claim or the specification defines
12 this element ("quantization step size coefficient") as being derived only from both masking and
13 absolute hearing thresholds. Instead, the language imported by Dolby—"the utilized scale factor,
14 is iteratively derived . . . from a calculated threshold of hearing . . . and the absolute threshold of
15 hearing," '938:3/63-4:1—specifies that the utilized scale factor is obtained using those thresholds
16 in that illustrative embodiment. The specification makes clear that "scale factors" can be derived
17 in several different ways. For example, it describes quantizing by using a "factor α such that if
18 all the initial thresholds are multiplied by this factor, the final total number of bits is smaller . . .
19 than the available number of bits." '938:21/14-16. Only if "at this point, neither the basic
20 masking threshold nor absolute thresholds have provided an acceptable bit representation . . . , an
21 iterative procedure . . . is employed to establish the interpolation factor[,]" which is the "utilized
22 scale factor." '938:21/44-48. Thus, several factors are used in this embodiment: (1) factors
23 based solely on the individual thresholds and (2) the utilized scale factor, which is derived from a
24 combination of the masking and absolute hearing thresholds. Finally, Lucent's expert, Dr.
25 Jayant, states: "the patent in suit will not prevent you from making use of only the masking
26 threshold" when determining the quantization step size. Fisher Decl., Ex. F (Jayant Depo. at
27 188:6-7). Thus, the invention may use different types of scale factors to determine the level of
28

1 quantization, that is, the sizes of the quantization steps.

2 The parties also make much of the addition of the word “coefficient” to “quantization
3 step size.” As noted above, Dolby asserts that the four-word term was unknown to a person
4 having ordinary skill in the art, while the three-word term was well known. However, both
5 parties define “coefficient” in this context as a factor by which something may be multiplied.
6 Thus, the plain meaning of the four-word term is “a factor by which a quantization step size may
7 be multiplied.” Dolby argues that Lucent’s expert witness, Dr. Jayant, acknowledged that
8 “coefficient” was superfluous. However, a closer reading of his deposition suggests that Dr.
9 Jayant views the *plural* “quantization step sizes” as equivalent to “quantization step size
10 coefficient.” This view is consistent with the use of this term in the specification and the claim.
11 That is, each group of frequency coefficients has an individually determined “quantization step
12 size.” The scale factor or quantization step size coefficient determines the size of the steps.
13 When there are multiple groups of frequency coefficients, there are multiple quantization step
14 sizes and multiple quantization step size coefficients. Quantization step size thus may vary
15 across groups of frequency coefficients by variable factors or coefficients.

16 Accordingly, looking to all of the evidence to provide insight into the meaning of the
17 term “set of quantization step size coefficients,” the Court construes this element as “set of
18 factors, each of which is used to determine the size of the steps between quantization levels for
19 discrete portions of the set of frequency coefficients.”

20
21 **i. “and”**

22 Lucent proposes its plain meaning: “as well as.” Dolby does not define this term
23 independently. See below, Part III.G.3.k.

24 **j. “absolute hearing threshold”**

25 Lucent proposes: “threshold that approximates the quietest sounds that can be heard
26 independent of the audio signal.” Dolby proposes: “level that varies as a function of frequency
27 which defines the lowest level of sound that can be heard; this threshold was standardized by the
28

1 International Standards Organization.”

2 Dolby disputes the use of the word “approximates,” arguing that it is vague. It points to
3 the specification, which describes the absolute hearing threshold as “the quietest sound that can
4 be heard at the frequency corresponding to the scale factor.” ‘938:22/56-58. Dolby claims that
5 Lucent should have included “Absolute Hearing Threshold Tables” in the ‘938 specification and
6 that without such tables the element is unclear to a person having ordinary skill in the art. Dolby
7 therefore asks the Court to limit the claim to the threshold determined by the International
8 Standards Organization.

9 Lucent argues that “[s]ince different people hear sounds differently, the ‘absolute’ hearing
10 threshold is an estimate of the average human’s hearing limits, based on years of auditory testing
11 and research.” Opening Brief, p. 26. Thus, the “absolute” hearing threshold is really an estimate.
12 Use of the International Standards Organization is not described anywhere in the specification or
13 prosecution history.

14 The Court construes “absolute hearing threshold” as “an estimate of the level at which the
15 quietest sounds can be perceived by the human auditory system.” Both parties admit that the
16 thresholds discussed in the patents are estimates because no one can be certain that every
17 possible person cannot hear such signals: Lucent asks for a construction that includes the word
18 “approximates,” while Dolby asks for the inclusion of an empirically determined table. The
19 specification supports the use of the word “estimate.” For example, the ‘457 patent, whose
20 application was incorporated by reference, describes one such method for estimating the level
21 below which most people cannot hear. ‘457:5/44-46. Dolby also puts forth another such method
22 arguing that it was meant to be in the ‘938 patent. Interpreting the claim according to the
23 disclosure suggests that the claim language cannot mean the level below which every person
24 cannot hear. Moreover, the Court’s construction does not import unwarranted limitations into
25 the claim, as would Dolby’s proposal to limit the claim to one specific empirical measure of the
26 level or Lucent’s proposed language, “independent of the audio signal.” Instead, it simply
27 defines the term according to the meaning elucidated in the specification.
28

1 k. **“determined by using the masking threshold and an absolute hearing**
2 **threshold”**

3 Lucent proposes: “determined by using the ‘signal-dependent, perceptually-based
4 auditory threshold that estimates the level below which signals will be perceptually masked’ ‘as
5 well as’ a ‘threshold that approximates the quietest sounds that can be heard independent of the
6 audio signal.’” Dolby proposes: “the set of quantization step size coefficients are determined by
7 both a masking threshold and the absolute hearing threshold repeatedly within the claimed rate
8 loop process.”

9 Both Lucent and Dolby refer the Court to their proposed constructions of “noise masking
10 threshold.” The Court has construed “noise masking threshold” and “masking threshold” as “a
11 psychoacoustically derived estimated value below which quantizing noise is not perceived by the
12 human auditory system.” The Court also has construed “absolute hearing threshold” as “an
13 estimate of the level at which the quietest sounds can be perceived by the human auditory
14 system.” The Court construes the word “and” according to its plain meaning: “and” is a
15 conjunction that signifies that both thresholds must be used. For example, in one embodiment,
16 the specification describes the use of both thresholds in determining the utilized scale factor,
17 which is one of the factors used to determine quantization step size. ‘938:22/39-67.

18 Nothing in the claim language of this element supports Dolby’s proposed additional
19 limitation: “repeatedly within the claimed rate loop process.” Dolby evidently found this
20 limitation from preceding language in the claim. The Court need not include such a limitation
21 twice in the claim, especially when the latter term makes no reference to such a limitation.
22 Although a rate loop processor is used “to determine a set of quantization step size coefficients”
23 and the “quantization step size coefficients [are] determined by using the masking threshold and
24 an absolute hearing threshold,” nothing in the claim language indicates that one determinant must
25 be performed by the other. The two determinants may be performed independently or in various
26 orders.

27 Accordingly, the Court construes this element as “determined by using both of two
28

1 thresholds: (1) a psychoacoustically derived estimated value below which quantizing noise is not
2 perceived by the human auditory system and (2) an estimate of the level at which the quietest
3 sounds can be perceived by the human auditory system.”

4
5 **H. Disputed terms of claim 2 of the ‘938 patent.**

6 **1. Disputed elements.**

7 The text of claim 2 is set forth below, with the disputed terms highlighted in bold type.

8 “2. The method of claim 1 wherein the **set of frequency coefficients** are **MDCT coefficients**.”

9
10 **2. Analysis.**

11 **a. “set of frequency coefficients”**

12 Lucent and Dolby refer to their arguments as to this element in claim 1 of the ‘457 patent.
13 For the reasons stated above with respect to claim 1 of the ‘457 patent, the Court construes this
14 element as a “set of values, each of which represents a property or characteristic of an audio
15 signal at a discrete range of frequencies of that audio signal at a discrete point in time.”

16
17 **b. “MDCT coefficients”**

18 Lucent proposes: “modified discrete cosine transform coefficients.” Dolby proposes:
19 “coefficients generated by the modified discrete transform described in Princen & Bradley,
20 ‘Analysis/Synthesis Filter Bank Design Based on Time Domain Alias Cancellation,’ IEEE Trans.
21 ASSP, Vol. 34, No. 5, October 1986.” In other words, Dolby looks to the specification for an
22 exact embodiment, as if this were a means-plus-function claim. Lucent notes that it included this
23 specific reference in the specification only as an example, and in fact preceded it with “e.g.”

24 The Court adopts Lucent’s proposal, because it simply defines the acronym used in the
25 claim. No further limitations need be imposed for a person with ordinary skill in the art to
26 understand the meaning of the claim.

1 **I. Disputed Terms of Claim 3 of the '938 patent.**

2 **1. Disputed elements.**

3 The text of claim 3 is set forth below, with the disputed terms highlighted in bold type.

4
5 “3. The method of claim 1 wherein the **using the rate loop processor in the iterative fashion** is
6 discontinued when a cost, measured by the number of bits necessary to code the **set of frequency**
7 **coefficients**, is within a **predetermined range**.”

8 **2. Analysis.**

9 **a. “rate loop processor”**

10 For the reasons stated above with respect to claim 1 of the '938 patent, the Court
11 construes this element as a “processor (hardware and/or software) that operates to meet the
12 required bit rate for a given application.”

13 **b. “iterative fashion”**

14 For the reasons stated above with respect to claim 1 of the '938 patent, the Court
15 construes this element as “characterized by the process of repeating a set of instructions a
16 specified number of times or until a specific result is achieved.”

17 **c. “using the rate loop processor in the iterative fashion”**

18 For the reasons stated above with respect to claim 1 of the '938 patent, the Court
19 construes this element as “using a processor (hardware and/or software), which operates to meet
20 the required bit rate for a given application, to repeat a set of instructions a specified number of
21 times or until a specific result is achieved.”

22 **d. “set of frequency coefficients”**

23 For the reasons stated above with respect to claim 1 of the '457 patent, the Court
24 construes this element as a “set of values, each of which represents a property or characteristic of
25 an audio signal at a discrete range of frequencies of that audio signal at a discrete point in time.”
26
27
28

1 e. **“predetermined range”**

2 Lucent proposes: “predefined limits.” Dolby proposes: “the range is determined in
3 advance but is otherwise unspecified.” Dolby refers to its discussion of claim 5 of the ‘457
4 patent, and Lucent points to support in the ‘938 patent. For the reasons stated above with respect
5 to claim 5 of the ‘457 patent, the Court construes this element as a “predefined limit.”

6
7 **J. Disputed terms of claim 4 of the ‘938 patent.**

8 **1. Disputed elements.**

9
10 The text of claim 4 is set forth below, with the disputed terms highlighted in bold type.

11 4. A decoder for decoding a **set of frequency coefficients** representing an audio
12 signal, the decoder comprising:

13 (a) **means for receiving the set of coefficients, the set of frequency coefficients**
14 **having been encoded by:**

15 (1) converting a time domain representation of the audio signal into a frequency
16 domain representation of the audio signal comprising the **set of frequency**
17 **coefficients;**

18 (2) calculating a **masking threshold based upon the set of frequency**
19 **coefficients;**

20 (3) **using a rate loop processor in an iterative fashion to determine a set of**
21 **quantization step size coefficients** needed to encode the **set of frequency**
22 **coefficients, said set of quantization step size coefficients determined by using**
23 **the masking threshold and an absolute hearing threshold; and**

24 (4) coding the **set of frequency coefficients based upon the set of quantization**
25 **step size coefficients; and**

26 (b) **means for converting the set of coefficients to a time domain signal.**

1 **2. Analysis.**

2 **a. “set of frequency coefficients” or “set of coefficients”**

3 For the reasons stated above with respect to claim 1 of the ‘457 patent, the Court
4 construes this element as a “set of values, each of which represents a property or characteristic of
5 an audio signal at a discrete range of frequencies of that audio signal at a discrete point in time.”

6 **b. “means for receiving the set of coefficients”**

7 The parties agree that this element is drafted in means-plus-function format pursuant to
8 35 U.S.C. § 112, ¶ 6. The function of the means term is to receive the set of coefficients in
9 claim 4. Dolby argues that the corresponding structure is “digital signal processor (DSP)
10 hardware, such as the AT&T DSP16 or DSP32C, very large scale integration (VLSI) hardware,
11 and hybrid DSP/VLSI hardware” as disclosed in the ‘938 specification. Lucent does not point to
12 any other structure disclosed in the ‘938 patent, but instead relies on a structure disclosed in the
13 ‘457 patent. Lucent argues that it may do so because the ‘457 patent was incorporated by
14 reference into the ‘938 patent. Lucent proposes: “the elements of a decoder capable of receiving
15 a set of frequency coefficients, whether implemented in hardware or software, including DSPs,
16 ASICs, and/or native signal processors, and equivalents thereof.”

17 The Federal Circuit, in *Atmel Corp. v. Information Storage Devices, Inc.*, 198 F.3d 1374
18 (Fed. Cir. 1999), indicated that one may use sources that were incorporated by reference to define
19 the disclosed structure of a means-plus-function claim if a person having ordinary skill in the art
20 would do so. Nonetheless, “Paragraph 6 does not contemplate the kind of open-ended reference
21 to extrinsic works that ¶ 1, the enablement provision, does.” *Id.* at 1382. Thus, the ‘457 patent
22 disclosure only can be used to help define the structure disclosed in the ‘938 patent if a person
23 having ordinary skill in the art would use that disclosure to help define the structure. Moreover,
24 to “incorporate material by reference, the host document must identify with detailed particularity
25 what specific material it incorporates and clearly indicate where that material is found in the
26 various documents.” *Advanced Display Systems, Inc. v. Kent State University*, 212 F.3d 1272
27 28

1 (Fed. Cir. 2000).

2 The portion of the '938 patent specification that refers to the decoder states: the
3 "stereophonic decoder has a very simple structure as shown in Fig. 12." Figure 12 is a box
4 diagram representing the technique. This portion of the specification describes "illustrative
5 embodiments," which "may comprise digital signal processor (DSP) hardware, such as the
6 AT&T DSP16 or DSP32C, and software performing the operations discussed below of the
7 present invention." '938:23/59-62. Although the patent discusses several operations, the only
8 function claimed here is that of "receiving the set of coefficients." The '938 patent also discloses
9 very large scale integration (VLSI) hardware embodiments and hybrid DSP/VLSI embodiments.
10 These are the only structures described in the specification. Nothing in the specification
11 indicates to a person having ordinary skill in the art that they should refer to the '457 patent to
12 find the structure underlying this element. The disclosed structure is not ambiguous and the
13 specification does not direct the reader to any portion of the '457 patent for incorporation of
14 further structures. No reference to the '457 patent is required to understand the terms.

15 When the patent specification describes multiple embodiments each of those
16 embodiments may be claimed pursuant to 35 U.S.C. § 112, ¶ 6. *Serrano v. Telular Corp.*, 111
17 F.3d 1578, 1583 (Fed. Cir. 1997). Accordingly, the Court construes this element as having the
18 following structure: "digital signal processor (DSP) hardware, such as the AT&T DSP16 or
19 DSP32C, very large scale integration (VLSI) hardware, or hybrid DSP/VLSI hardware, and
20 software."

21 **c. "masking threshold"**

22 For the reasons stated above with respect to claim 1 of the '938 patent, the Court
23 construes this element as "a psychoacoustically derived estimated value below which quantizing
24 noise is not perceived by the human auditory system."

25 **d. "based upon"**

26 For the reasons stated above with respect to claim 1 of the '457 patent, the Court
27 construes this element as "having as its basis."
28

1 e. **“based upon the set of frequency coefficients”**

2 For the reasons stated above with respect to claim 1 of the ‘457 patent, the Court
3 construes this element as a “having as its basis a set of values, each of which represents a
4 property or characteristic of an audio signal at a discrete range of frequencies of that audio signal
5 at a discrete point in time.”

6 f. **“rate loop processor”**

7 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
8 construes this element as a “processor (hardware and/or software) that operates to meet the
9 required bit rate for a given application.”

10 g. **“iterative fashion”**

11 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
12 construes this element as “characterized by the process of repeating a set of instructions a
13 specified number of times or until a specific result is achieved.”

14 h. **“using a rate loop processor in an iterative fashion”**

15 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
16 construes this element as “using a processor (hardware and/or software), which operates to meet
17 the required bit rate for a given application, to repeat a set of instructions a specified number of
18 times or until a specific result is achieved.”

19 i. **“set of quantization step size coefficients”**

20 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
21 construes this element as “set of factors, each of which is used to determine the size of the steps
22 between quantization levels for discrete portions of the set of frequency coefficients.”

23 j. **“and”**

24 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
25 construes this element as “a conjunction that signifies that both thresholds must be used.”

26 k. **“absolute hearing threshold”**

27 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
28 construes this element as the “an estimate of the level at which the quietest sounds can be

1 perceived by the human auditory system.”

2 **l. “determined by using the masking threshold and an absolute hearing**
3 **threshold”**

4 For the reasons stated above with respect to claim 1 of the ‘938 patent, the Court
5 construes this element as “determined by using both of two thresholds: (1) a psychoacoustically
6 derived estimated value below which quantizing noise is not perceived by the human auditory
7 system and (2) an estimate of the level at which the quietest sounds can be perceived by the
8 human auditory system.”

9 **m. “means for converting the set of coefficients to a time domain signal”**

10 The parties agree that this element is drafted in means-plus-function format pursuant to
11 35 U.S.C. § 112, ¶ 6. The function of the means term is to convert the set of coefficients to a
12 time domain signal. As with the preceding means-plus-function element, Dolby argues that the
13 corresponding structure is “digital signal processor (DSP) hardware, such as the AT&T DSP16
14 or DSP32C, very large scale integration (VLSI) hardware, and hybrid DSP/VLSI hardware” as
15 disclosed in the ‘938 specification. Lucent refers to the structure disclosed in Fig. 12 of the ‘938
16 patent, but it also relies on a structure disclosed in the ‘457 patent. Lucent argues that it may do
17 so because the ‘457 patent was incorporated by reference into the ‘938 patent. Lucent proposes:
18 “a decoder capable of converting a set of frequency coefficients into a time domain signal,
19 whether implemented in hardware or software, including DSPs, ASICs, and/or native signal
20 processors, and equivalents thereof.”

21 Lucent and Dolby refer to their arguments as to this element discussed in Part III.J.2.b of
22 this Order. For the reasons discussed previously, the Court declines to look for the structure in
23 the ‘457 patent. Accordingly, the Court construes this element as having the following structure:
24 “digital signal processor (DSP) hardware, such as the AT&T DSP16 or DSP32C, very large scale
25 integration (VLSI) hardware, or hybrid DSP/VLSI hardware, and software.”
26
27
28

1 **IV. CONCLUSION**

2 For the reasons discussed herein, the Court construes the disputed claim terms as set forth
3 above.

4 IT IS SO ORDERED.

5
6 DATED: November 18, 2003

7 /s/ (electronic signature authorized)

8 JEREMY FOGEL

9 United States District Judge
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